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Applicant : Gary C. Johnson (applicant pro se)
Title : Johnson-positive action continuous traction (p.a.c.t.) differential.
Examiner : Dirk Wright
Art Unit : 3681

DETAILED DESCRIPTION OF THE INVENTION (5-pages)

This invention pertains to a new vehicle differential. The new differential having these advantages :

(1) an all gear drive system,

(2) continuous drive means to each drive axle/wheel,

(3) forced / allowed ,inversely proportional rotation variability between axle sections ; only when needed,

(4) anti roll-back means of the drive wheels / axle sections on an inclined drive surface,

(5) also having dual internal driving means to each drive axle section / wheel.

The said new differential shown in the drawing, is herein described.

The housing 25, (shown fragmented) is the outermost support element of the said; new differential. The end plate 20, is affixed to the case 8, by bolts 28, and 30. The differential case 8; being rotatively supported,and axially supported in the said housing 25; by way of the outwardly protruding axial stock of case 8. The said

new differential; being rotated by way of the crown gear 24,shaft 23, and gear 22. Gear 22; being splined to the shaft 23. Shaft 23; being rotatively supported by the housing 25. The case 9; being axially, and rotatively supported by the case 8; by way of the protruding end support stock of case 9, and the bearing 26. The case 9; being supported also, by way of bevel gear 11, and shaft 19.

The said bevel gear 11; being axially affixed/splined to the case 9. The bevel gear 11; being axially supported and rotatively supported by way of the bearing 21 and the shaft 19. The shaft 19; by way of it's end support stock 2; is axially supported and stationary to the case 8; by way of the support member 1. The support member 1 (shown with a circular invisibility line) is affixed/stationary to the case 8. Pinion shafts 3 and 4; are stationary to case 8; by way of case 8 and the said support stock 2; of shaft 19. The axle shaft 5; being entered and supported rotatively through / by the central stock of case 8, support 1, and shaft 19. The final resting place of axle shaft 5; being the central inside wall of case 9. The bevel gear 12 is splined/stationary to the axle shaft 5. The bevel gear 12; being axially and rotatively supported in the case 8; by way of the bearing 27 and the extended support stock of the said bevel gear 12. The bevel gears 13 and 14; being rotatively stationary to the case 8; by pinion shafts 3 and 4. The bevel gears 13 and 14; being in continuous engagement contact with the bevel gears 11 and 12. The axle shaft 10; being axially splined/stationary to the extended support stock of the case 9. The gear 6 is axially splined/stationary to the end of axle shaft 5. The gear 7 is axially splined to the end of shaft 19. The shafts 17 and 18 are stationary to the case 9 and parallel to the axis

(a) wherein rotation variability, between axle sections is needed; due to drive path curvature (when referred to; axle section / sections, also includes the drive wheel , of the axle section / sections referred to).

Wherein the axle section of axle 5, and gear 6, is rotating slower than the drive case 8; due to external force. The gear/gears; 15 /16, will herein be forced to rotate inversely proportional over / around gear 7. Thus causing the axle section of axle 10, to also rotate inversely proportional; relative to the axle section, of axle 5.

(b) wherein the axle section of axle 10, has complete traction, and complete rotation resistance and the axle section of axle 5; having neither. The axle section of axle 10; being / beginning at 0 rpm.

The said new differential is designed to automatically go into a gear-locking effect / mode. The above said axle section, of axle 10; being / beginning at 0 rpm. Herein; the gear / gears 15 /16; being stationarily rotative. Therefore the gears 7, 6, and 12, are caused / forced to rotate at the same rpm as the drive case 8. Thus preventing rotation of the gear / gears 13 /14, on their respective shafts 3 /4. Therein also preventing the independent rotation ability of gear 11, and it's axle section / axle 10. Herein both axle sections, are forced to rotate at the speed as case 8.

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(c) wherein the axle section of axle 5, has complete traction, and complete rotation resistance; and the axle section of axle 10, having neither. Herein the axle section of axle 5; being / beginning at 0 rpm .

In the above said circumstance, the said; new differential is designed to automatically go into a gear-locking effect / mode. Whereas gear 6, of axle 5, is also at 0 rpm. Herein the gear 7; of shaft 19, and drive case 8, will try to rotate the case 9, by way of the gear / gears 15 /16; but in an opposing direction to that of drive case 8. Whereas gear 12, of axle 5, is also at 0 rpm; the gear / gears 13 /14 , will try to rotate the case 9, by way of gear 11; but in the same direction as the drive case 8. Herein, two different drive forces / members are acting on the same driven member; and at the same time. Hereby causing the afore said; gear-locking effect / mode. Each axle section ; hereby is forced to rotate at the same rpm as the other axle section, and the case 8.

(a) wherein traction is lost by one of either axle section; on an inclined drive surface. Herein a situation called; " vehicle roll-back " could occur.

The afore mentioned gear-locking effects / modes; will prevent loss of momentum of the axle section that has traction. This said new differential is designed; and the axle sections integrated in such a way; that equaled drive rotation resistance is caused; one axle section to the other.

Safety is an inherent advantage of the said; new (p.a.c.t.) differential. "Fish-tailing"; due to sudden drive surface traction of an over accelerated drive wheel, is preventable.

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